Claim Amendments:

Claim 1 (Canceled).

Claim 2 (Canceled).

Claim 3 (Canceled).

Claim 4 (Canceled).

Claim 5 (Canceled).

Claim 6 (Canceled).

Claim 7 (Canceled).

Claim 8 (Canceled).

Claim 9 (Canceled).

Claim 10 (Canceled).

Claim 11 (Canceled).

Claim 12 (Canceled).

Claim 13 (Canceled).

Claim 14 (Canceled).

Claim 15 (Canceled).

Claim 16 (Canceled).

Claim 17 (Canceled).

Claim 18 (Canceled).

Claim 19 (Canceled).

Claim 20 (Canceled).

Claim 21 (Currently amended). ~~Method~~ A method for the production of a nucleic acid molecule comprising the steps

a) providing an oligonucleotide which is prepared by the following steps:

aa) coupling one end of an oligonucleotide to a solid matrix wherein the coupling is effected by means of a modification and the oligonucleotide contains a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence,

ab) adding an additional oligonucleotide separate from the oligonucleotide of aa) which is at least partially double-stranded and contains a different recognition sequence than in step aa) for a type IIS restriction enzyme which cleaves outside its recognition sequence, whereby this oligonucleotide cannot bind to the matrix,

ac) ligating the oligonucleotides from steps aa) and ab) in ~~the~~ an orientation determined by ~~the~~ a blockage of ~~the~~ ends of the oligonucleotides from steps aa) and ab) that are not to be ligated,

ad) removing ~~non-consumed reactants and enzymes~~ oligonucleotides from steps aa), ab) and ac) that are not coupled or ligated,

ae) cleaving the ligation product from step ac) with a type IIS restriction enzyme which cleaves outside its recognition sequence whereby the cleavage occurs in the nucleic acid sequence of the oligonucleotide from step ab) and resulting in an elongated oligonucleotide and a shorter oligonucleotide,

af) separating the ~~reaction mixture~~ type IIS restriction enzyme and the shorter oligonucleotide from the elongated oligonucleotide ~~from step aa)~~ obtained in step ae),

ag) repeating steps ab) to af) at least once,

b) ~~P~~providing an additional oligonucleotide which is prepared by the following steps:

ba) coupling one end of an oligonucleotide to a solid matrix wherein the coupling is effected by means of a modification and the oligonucleotide contains a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence,

bb) adding an additional oligonucleotide separate from the oligonucleotide of ba) which is at least partially double-stranded and contains a different recognition sequence than in step ba) for a type IIS restriction enzyme which cleaves outside its recognition sequence, whereby this oligonucleotide cannot bind to the matrix,

bc) ligating the oligonucleotides from steps ba) and bb) in ~~the~~ an orientation determined by ~~the~~ a blockage of ~~the~~ ends of the oligonucleotides from steps ba) and bb) that are not to be ligated,

bd) removing ~~non-consumed reactants and enzymes~~ oligonucleotides from steps ba) and bb) that are not coupled or ligated,

be) cleaving the ligation product from step bc) with a type IIS restriction enzyme which cleaves outside its recognition sequence whereby the cleavage occurs in the oligonucleotide from step bb) and resulting in an elongated oligonucleotide and a shorter oligonucleotide,

bf) separating the ~~nucleic acid molecule elongated in this manner from the reaction mixture~~ type IIS restriction enzyme and the shorter oligonucleotide from the elongated oligonucleotide obtained in step be),

bg) repeating steps bb) to bf) at least once, wherein after the last ligation in step bc) and removing ~~non-consumed reactants and enzymes~~ oligonucleotides that are not coupled or ligated to obtain a ligation product, the ligation product is cleaved with a type IIS restriction enzyme whereby the cleavage occurs in the oligonucleotide from step ba),

c) ligating the oligonucleotides from steps a) and b) in ~~the~~ an orientation determined by ~~the~~ a blockage of ~~the~~ ends of the oligonucleotides from steps a) and b) that are not to be ligated,

d) removing ~~non-consumed reactants and enzymes~~ oligonucleotides from steps a), b) and c) that are not coupled or ligated,

e) cleaving the ligation product from step c) with a type IIS restriction enzyme which cleaves outside its recognition sequence whereby the

cleavage occurs in the oligonucleotide from step a) or b) and resulting in an elongated oligonucleotide and a shorter oligonucleotide,

f) separating the ~~nucleic acid molecule elongated in this manner from the reaction mixture~~ type IIS restriction enzyme and shorter oligonucleotide from the elongated oligonucleotide obtained from step e).

Claim 22 (Currently amended). ~~Method as claimed in claim 21, wherein the oligonucleotide used in step ab) or bb) is a nucleic acid molecule produced by the method as claimed in claim 21~~ A method for the production of a nucleic acid molecule wherein an oligonucleotide is produced from the method of claim 21, step f), and is used in an additional method of claim 21 in step ab) or bb).

Claim 23 (Currently amended). ~~Method~~ The method as claimed in claim~~s~~ 21 ~~or 22~~, wherein an exonuclease and/or phosphatase reaction is carried out as step ac)', bc)' or c)' after step ac), bc) or c).

Claim 24 (Currently amended). ~~Method~~ The method as claimed in claim 23, wherein the ~~reaction mixture~~ type IIS restriction enzyme, the shorter oligonucleotide, the unreacted exonuclease and the unreacted phosphatase of step ~~ac')~~ac)', bc)' or c)' ~~is~~ are removed after the reaction.

Claim 25 (Currently amended). ~~Method~~ The method as claimed in one of the claim~~s~~ 21 ~~to 23~~, wherein the end of the oligonucleotide from step a), aa) or ba) that is not coupled to the matrix contains a part of a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence and the other part of the recognition sequence for this restriction enzyme is derived from the oligonucleotide from step ab), bb) or b).

Claim 26 (Currently amended). ~~Method~~ The method as claimed in claim~~s~~ 21 ~~to~~ ~~25~~, wherein the modification is a biotin residue, a digoxigenin residue, a fluorescein isothiocyanate residue, an amino compound or a succinyl ester.

Claim 27 (Currently amended). ~~Method~~ The method as claimed in ~~one of the~~ claim~~s~~ 21 ~~to 26~~, wherein the oligonucleotide from step aa), ha) or a) and/or ab), bb) or b) has a loop.

Claim 28 (Currently amended). ~~Method~~ The method as claimed in claim 27, wherein the oligonucleotide from step aa), ba) or a) is coupled via a modification in the loop region to the solid matrix.

Claim 29 (Currently amended). ~~Method~~ The method as claimed in ~~one of the claims 21 to 28~~ claim 21, wherein the solid matrix is selected from the group consisting of a bead, ~~preferably made of glass or polystyrene~~, a microscope slide, a DNA chip, the well of a microtitre plate ~~or~~ and a test tube.

Claim 30 (Currently amended). ~~Method~~ The method as claimed in ~~one of the claims 21 to 29~~ claim 21, wherein the solid matrix comprises a streptavidin residue, an anti-digoxigenin antibody or an anti-fluorescein isothiocyanate antibody.

Claim 31 (Currently amended). ~~Method~~ The method as claimed in ~~one of the claims 21 to 30~~ claim 21, wherein the oligonucleotides from steps aa), ba) or a) and ab), bb) or b) have mutually complementary single-strand overhangs at ~~their~~ ends of the oligonucleotides from steps aa), ba), a) ab), bb) and b) to be ligated.

Claim 32 (Currently amended). ~~Method~~ The method as claimed in claim 31, wherein the single strand overhangs are 1, 2, 3, 4 or 5 nucleotides long.

Claim 33 (Currently amended). ~~Method~~ The method as claimed in claim~~s~~ 21 ~~to~~ ~~32~~, wherein in step bg) ribozymes are used instead of type IIS restriction enzymes ~~the various type IIS restriction endonucleases are replaced by ribozyme~~s which cleave in an analogous manner as compared to the type IIS restriction enzymes.

Claim 34 (Currently amended). ~~Method~~ The method as claimed in ~~one of the~~ claim~~s~~ 21 ~~to 33~~, wherein the oligonucleotide in step ab), bb) or b) is a PCR product, a plasmid vector, a phage or viral DNA, an artificial chromosome or another synthetic DNA.

Claim 35 (Withdrawn). Kit for the production of a nucleic acid sequence by the method as claimed in one of the claims 21 to 34, comprising:

a) a library of 1 to 1,048,576 different oligonucleotides wherein the oligonucleotides can be coupled to a solid matrix by means of a modification at one end and the oligonucleotide contains a recognition sequence or a part of the recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence,

b) an additional library of 4 to 1,048,576 different oligonucleotides wherein each of the oligonucleotides contains a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence which is different from the type IIS restriction enzyme from aa), ba) or a) and optionally contains the other part of the recognition sequence of the restriction enzyme from step aa), ba) or a)

c) a solid matrix,

d) reservoirs for the enzymes required to produce the nucleic acid molecule and/or other reagents.

Claim 36 (Withdrawn). Device for the automated production of a nucleic acid molecule by a method as claimed in one of the claims 21 to 34, characterized in that it contains

a) a library of 1 to 1,048,576 different oligonucleotides wherein the oligonucleotides can be coupled to a solid matrix by means of a modification at one end and the oligonucleotide contains a recognition sequence or a part of the recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence,

b) an additional library of 4 to 1,048,576 different oligonucleotides wherein each of the oligonucleotides contains a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence which is different from the type IIS restriction enzyme from aa), ba) or a), and optionally contains the other part of the recognition sequence of the restriction enzyme from step aa), ba) or a),

c) a solid matrix,

d) reservoirs for the enzymes required to produce the nucleic acid molecule and/or other reagents and,

e) a control program which can identify individual oligonucleotides from aa), ba) or a) and ab), bb) or b), contact them with the solid matrix from ac), bc) or c) and with the required enzymes andlor other reagents from ad), bd) or d) and determine and carry out the sequence of synthesis steps.

Claim 37 (New). A method as claimed in claim 29 wherein the solid matrix is a bead and said bead is made of a material selected from the group consisting of glass and polystyrene.